JOURNAL

OF

THE ASIATIC SOCIETY.

No. 71.—*November,* 1837.

I.—*Journal of a Trip to the Burenda Pass in* 1836. *By Lieut.* THOMAS HUTTON, 37*th Regiment, Native Infantry.*

On the 22nd of September, 1836, I started from *Simla,* which averages an elevation of 7,200 feet above sea level, in company with a small party of friends, on a trip to the *Burenda Pass,* with the intention of crossing into *Kanáwar.* The road from *Simla* to the top of *Mahássú,* is a pretty steep ascent for nearly the whole way, but the scenery, particularly in the forest, is very beautiful and reminds one much of the grounds around a gentleman's country seat at home.

Several species of pines and thorny-leafed oaks, intermixed with large plane trees and various others, compose the forest. Black currant bushes and raspberries, both yellow and red, are plentiful, as also the blackberry or bramble. The fruit of the former is much sought after by the residents at *Simla,* to make preserves with: wild strawberries are also abundant and richly flavoured.

Flowers*[1] of various kinds are scattered over the more open parts of the forest, and flitting over them may be seen numerous butterflies, many of which are common to Britain and continental *Europe.* Among others I recognised and captured the beautiful 'swallow-tail'd'[2] and 'tortoise-shell' butterflies[2];—the caterpillar of the latter, being the same as that of Europe, and like it feeding on the nettle.

The 'painted lady'[2] is also abundant, as well as the large[2] and small 'cabbage butterflies[2].' 'The black-veined white'[2] is among the most numerous, and many of the beautiful little species belonging to the Genus *Polyommatus.*

* See notes at the end.

Here also beneath the decaying trunk of fallen trees I discovered in abundance some new species of land snails[4] belonging to the genera, *nanina,* and *bulimus.*

Pheasants are plentiful down the *khads,* but it is hard work hunting for them.

The *plass* or *pucras* pheasant[5] and another bird called, the *khalij*[5] pheasant, are the commonest, but the *monál*[5] is to be met with towards the latter end of autumn and during the winter season, as also the woodcock[5]; indeed one of the latter birds, I saw flushed in the month of August, and a brace were seen at *Simla* this year in November.

Wild hogs are abundant in the deep glens, where they shelter themselves all day, and at night sally forth to regale on the grain fields, much to the annoyance of the farmers;—they also visit the higher and more open parts of the forest where they turn up the ground in search of aromatic roots, &c.

Bears*, too, are numerous in the rocky glens, arriving from the colder parts of the hills in the autumn and staying during the winter, —retiring again to the interior about April, as the weather becomes hotter.

Besides these, many other animals are inhabitants of this forest, such as the leopard[6], leopard cat[6], the hill fox[6], and troops of lungoors[6], as also the musk deer[6] and flying squirrel[6].

The former animal is seldom seen except at night when it prowls about the sheep-folds, and is often as much the terror and pest of the poor highland villagers, as the more formidable tiger is to the inhabitants of the plains.

At *Simla* where the leopard is by no means scarce, it is necessary at nightfall to shut up the dogs, or they would, invariably sooner or later, as indeed numbers do, fall victims to the voracity of this prowling savage. Even in open day, dogs are frequently snatched up by this animal, when hunting along the wooded banks, only a few yards from their masters. Instances are even on record of their entering houses at night when the doors have been incautiously left open.

Large tracts of the forest of the *Mahássú* have of late years been cleared for the purpose of planting potatoes, which thrive well on sloping grounds and are cultivated to a great extent, vast quantities being annually sent to the plains for sale.

The magnificent timber which once abounded here is fast falling beneath the woodman's axe, and it is to be feared that ere long, the so much vaunted beauty of this forest, will have passed away. The demand for good timber, for the purposes of building, since *Simla* became a resort for invalids, has been so great, that the needy and money-loving Ránas, have turned the gigantic beauties of the forest, to account, and many places are beginning to look quite bare and naked from the constant drain upon them.

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* Ursus Thibetanus.

It is more than probable, if this destruction continues, that in a few years the forest will be ruined ; for it is a curious and melancholy fact, that but very few young trees are springing up to supply the places of the parent stock.

Many fine trees are also destroyed by the practice of setting fire to the jangal grass, for the turpentine which exudes so plentifully from the pine trees, immediately takes fire and the bark of the tree is destroyed at the base. The consequence is that rain finds a lodgment and rots the outer wood, which having become soft is immediately discovered and attacked by insects, and the tree in a short time withers and falls. Hundreds of these trees as also many fine oaks are to be seen in every stage of disease, both standing and fallen, and almost all arising in the first instance from the fire having injured or destroyed the bark around the base.

In this stage, stage-beetles[3], capricorn beetles[3] and also the click beetles[3] whose larvæ are nourished in decaying trees, are all busy in completing what the fire has commenced, and even a species of snail[4] contributes much to the ultimate ruin of the sturdy oak by boring into every hole and crevice and reducing the fibre of the wood to the consistency of moist sawdust.

It is upon such trees that the woodpeckers, in search of insects within, bore innumerable holes, and although they are labouring with the laudable intent of destroying the hidden foe, yet they also in no small degree hasten the decay of the wood, by boring so many fresh inlets for the rain and snow.

It must be remembered however, that these much abused birds never attack a sound and healthy tree, and their share in the destruction of a decaying one, may be forgiven, on the certainty of its being destroyed even without their aid, by the insects already within it.

The highest peak of *Mahássú* is 9140 feet above the level of the sea; but the *Deví* temple, past which the road runs, is only 9078 feet, after which the road gradually descends for about two miles through the forest to *Fágú*, where there is a small bungalow of one room, belonging to government, and which is the usual halting-place for travellers, being about twelve miles from *Simta.*

The elevation of the bungalow is 8040 feet.

From this place a road branches off through the *Jubal* country towards the *Chor* mountain, which is one of the lions usually visited by travellers, and attains an elevation of 12,149 feet. The road across the hills to *Masúrí* also lies in the same direction.

At *Fágú* we halted one day and on the 24th September pursued our march towards *Mattiána,* which is the second stage from *Simla* to the cantonment of *Kotgarh,* and where there is another small bungalow of one room. Elevation 8070 feet.

The grassy hills between *Fágú* and *Mattiána* produce during the rains, immense quantities of a species of *orchis,* called by the natives "*salep misrí,*" the roots of which are sometimes collected and dried, and afterwards brought to *Simla* or sent to the plains for sale. If care and culture were bestowed upon these plants and the drying of the roots properly attended to, why might not the hill plant equal the famous Persian and Turkish *salep misrí,* which is now sold at such high prices as almost to preclude the possibility of using it? The hill plant grows at *Simla* and is pretty generally diffused over the interior, and as it may be had in almost any quantities, an important and nourishing addition to the diet of infants and invalids might be furnished at a reasonable and even cheap rate.

The road from *Fágú* is seen for miles running along the side of a bare hill, which on one side shuts out the view, while on the other are deep glens with here and there a few houses. It is a long and dreary march of about 14 miles, and as the party I was with were keen sportsmen, we agreed to breakfast at a wood about half-way, and three miles beyond the old fort of *Theog,* which stands on an eminence near the road and is 8013 feet above the sea.

After breakfast we beat the forest for game and found a musk deer and some plass pheasants, as also the hill partridge and the shikárí of the party brought in some *chicórs*[5].

The whole of this day we walked on leisurely down the *khads* for the two-fold purpose of finding game and avoiding the dreary road to *Mattiána.* In the evening we came to our encamping ground in the bed of the glen below *Mattiána* bungalow, on the banks of a stream, which wound along among the bluff rocks and thickly wooded hills, giving a beautiful and romantic appearance to the scene which is here highly picturesque, the banks of the glen rising some hundreds of feet high on either side, and clothed to the top with trees and brushwood.

Here we found that beautiful little flower, *parochetus communis,* figured in Royle's Illustrations. It was growing in profusion among the damp rocks and caves on the banks of the stream. I have since found that it is common also at *Simla.*

In the morning just before daybreak on the 25th we heard the hill blackbirds singing very sweetly from the woods above us. The song is not unlike that of the European blackbird. These beautiful birds commence singing about the middle of autumn and continue their songs throughout the winter and spring, after which they betake themselves to the interior, being autumnal and winter visitants rather than constant residents of the lower hills, although a few may be occasionally met with throughout the year. In the winter season they are found as low down as the vale of *Pinjore.*

At daybreak on the 26th September we ascended a very steep hill towards *Nágkunda,* breakfasting about half-way, by the side of a hill stream and then continuing our journey. On this road are plenty of chicores and a few were shot by the party.

At *Nágkunda* we found two gentlemen from *Simla* who had come thus far to see the beauties of the interior before leaving India for home. In consequence of this rencontre we halted a day and beat the wood for game. Some plass and *khalij* pheasants were killed, and a male musk deer was brought in by one of the shikárí.

The bungalow at this place is larger than those of *Fágú* and *Mattiána,* possessing one large and two small rooms, which afford very comfortable accommodation to travellers. The elevation is 9016 feet.

The scenery from this place is very beautiful.

The cantonment of *Kotgarh* is seen in a slope in the distance, and is much lower than *Nágkunda,* and surrounded by mountains of every shade, from the deepest forest green, to the bare and barren rock, while the long line of eternal snows towers far above them all in the back ground. In the *khads* below the bungalow we found several nut trees with fruit on them, and very similar to filberts in appearance, but all were rotten, and judging from the number of nuts strewed upon the ground, all of which were likewise rotten and were the fruit of the preceding year, I should be inclined to think that few ever ripened. Dr. Gerard mentions having found them rotten in 1818.

The nut tree here grows to a good size, and unlike the hazel bushes of Europe, is really a large tree, springing up some height before the branches spread out, and the trunks of many exceeding a man's body in girth. The tallest trees must have been from 30 to 40 feet high at least.

Flowers of different kinds are here abundant, every open space or grassy hill being studded with various colors; the *anemone discolor, parnassia nubicola,* and *potentilla pteropoda* of Royle are innumerable, while in the deep glens or *khads,* growing in damp vegetable moulds, a beautiful white species of *cypripedium* is found, as also a very large white lily, which grows to a height of 6 or 7 feet.

Here also we found a fruit resembling a wild quince, but growing on large trees, with leaves very similar to those of the nut trees.

Another fruit was brought us, which in taste was something like the sloe, the stone somewhat resembling that of the little wild cherry of Britain. The tree is tall and at first sight resembles the cherry tree, but the fruit grows on the stalks in a different manner, being placed at unequal distances up a long straight stem. The hill people call the tree *jummoo, (jamú.)*

These forests are also well stocked with splendid yew trees and pines of enormous growth. The birch is said by travellers to grow here also, but we were not fortunate enough to see any.

On the afternoon of this day a shower of rain fell and the wind was very cold; the snow evidently falling fast over the snowy range which was very white. The sky black and threatening.

On the 27th after breakfast we started from *Nágkunda* and crossed the top of *Hattú* or *Whartú,* a steep hill in the neighbourhood about 10,656 feet high. From the top of this mountain a splendid view opens upon the traveller, and some of the houses at *Simla* are seen, while the snowy range, in its vast extent is laid open. Here I took some fine specimens of snails[*] of the genera *nanina* and *bulimus,* among the loose stones and ruins of the old *Gurkha* forts which crest this mountain. The shells of the former genus, far exceed in size, those of the warmer hills of *Mahássú.* Here, also, on the very top of the ruins, I found a solitary plant of *mulgedium manorhizum* in flower, its roots firmly wedged in between the massive stones.

There are a few stone huts on the top of this hill erected by an officer, as a temporary shooting box. After resting awhile and enjoying the fine view, we went down the opposite side of the mountain and a few miles farther on brought us to our encamping ground at a place called *Bagie* beneath a hill crowned with the ruins of an old fort of that name, and a short distance above a village called *Shail.*

From this village excellent coolies are procurable and we got all necessary supplies very easily, the villagers coming into camp with grain, ghee and milk.

Part of the road after leaving *Hattú,* lay through a wood and was frequently interrupted by fallen timber. In the open parts among beautiful flowers of different kinds and colors, gave a very pleasing effect to the scene. At one part of the road, an otherwise bare rock, was bedecked with numerous plants of *mulgedium manorhizum* of Royle, while in the first I gathered the golden flowers of "*corvisartia indica.*"

Here again European forms of butterflies presented themselves, sporting among the flowers of the forest. The 'large tortoise-shell'[2] and 'brimstone butterflies,'[2] were recognized, as also the 'marbled white'[2] and two others which appear to be but varieties of the European insects *argynnis aglaia* and *vanessa atalanta.*

Many others peculiar to these hills were also noticed.

Not finding ground to ride over during the latter part of this march some of the party sent back their ponies.

The distance travelled this day was about 12 miles, of which the first five or six were very steep. The elevation of *Bagie* is 9084 feet; the village from which our supplies came is 7400 feet.

Early on the morning of the 28th September we resumed our march and found the whole way beautifully varied with flowers, chiefly of a species resembling a blue China aster. The road or rather track, lay sometimes through deep and shady woods, every now and then opening out upon grassy hills, at other times leading up over rugged rocks resembling steps, with scarcely room sufficient for our feet; the scenery was indeed beautiful and grand by turns, one while presenting verdant meadows, thickly begemmed with flowers, and bounded by dark woods of various shades, at another time changing to dark and frowning rocks, towering high in wild confusion, like the ruins of some ancient and mighty castle of the fabled giants. In shady places hoar frost was lying thick upon the grass. The path became at length so rugged and unfit for riding over, that we sent back the rest of our ponies and determined to perform the remainder of our trip on foot, which soon proved a case of necessity.

We breakfasted about half-way, on the side of a grassy hill, near a large flock of sheep which were folded beneath a huge overhanging rock, and guarded by several fierce and powerful hill dogs.

Large flocks of sheep are pastured on these open patches, and as the pasture is consumed they are driven on to others, always tended by their sagacious and watchful guardians the dogs, to whom indeed the care of the flock is almost entirely trusted, the men lying idly by or knitting shoes and socks of worsted. When in want of a sheep or lamb we found great difficulty in inducing these people to part with one out of a flock of several hundreds; if we succeeded in attaining one, it was always lame, sick or past breeding and only fit for our dogs.

The reason is, because the sheep are a great and indeed their only source of profit, and are kept for the sake of the wool which is manufactured into blankets and coarse looees *(lúís)* and sold or bartered for other necessaries.

After breakfast we again pursued our journey over similar ground, and at length halted on the side of another open grassy hill called by the guides *Tútú,* the village of *Thar* being far below us in the *khad.* Supplies of grain, ghee and milk were easily procured.

On the side of this hill and along the latter part of the march since breakfast, plants of the wild iris were abundant and apparently of two kinds : I say apparently, because I could only judge so, from the seeds, which differed not only in size and color, but grew somewhat differently, the largest seeds being close to the ground on a short stalk, and the smaller kind raised on a stalk of six or seven inches long. The plants had long ceased to flower, as the seeds were ripe and falling.

Some of these plants and seeds I collected and on my return to *Simla,* the former were planted and have this year (1837) put forth beautiful dark flowers of about half the size of the garden iris, and having the outer or hanging petals spotted with deep lilac, instead of being somewhat striated as in the cultivated plants at *Simla :* the whole flower is much darker. Whether known or not I leave botanists to decide.

This place was the first good monaul ground we came to, and the sportsmen of our party shot several fine birds in the afternoon. It is a beautiful sight to see a cock monaul rise from the cover ; he takes wing rapidly down the *khad,* uttering a loud and musical whistle which he quickly repeats during his descent, until he again alights. They are very fond of perching themselves on the top of some bare rock or stone and thence surveying the ground around them. In the morning and evening while feeding, it is difficult to get near them, as they are wary birds, but the best time to get them is during the heat of the day when they are lazily reposing among the brushwood covers and are unwilling to rise, thus allowing you to come near enough to make pretty certain of bringing them down. Being strong birds, they sometimes manage to carry away a good deal of shot.

A sportsman can generally tell whether birds are in the neighbourhood, by observing the holes which they make in the ground in search of roots and insects. It is a curious thing, that when the monaul is kept in confinement the bill, from wanting the friction caused by digging in the ground, becomes very long and hooked.

One of the party here shot a solitary snipe in a small patch of boggy ground near the camp. It is identical with that described by Mr. Hodgson as the *galinago solitaria* of *Nepál.*

After breakfast on the 29th we started over very hilly ground and narrow broken paths, guided by the shikárís of the party, and made a short march to a nameless place in the forest, on the side of a hill. No village being near us, we were obliged to bring on supplies from the last halting ground. Wild iris again abundant.

To-day some monauls and a young musk deer were shot. It has often been said that the musk deer is not eatable on account of the strong flavour of musk imparted to the flesh. We had the young deer dressed and all pronounced it to be excellent, and in my opinion, far surpassing any venison I have tasted in India.

The young deer has no musk bag and therefore cannot be offensive, and the same must apply to the female, who is also destitute of the musk. An old male may very possibly be bad eating, but so I suspect would be an old he-goat ! !

On the 30th we marched up very steep and rocky ground, breakfasting at the edge of a wood and afterwards pushing on again over narrow paths, sometimes affording barely sufficient room for our feet. One of our party unfortunately fell and cut his knee, in consequence of which he came on very slowly, and complained much of pain.

This day we encamped at a village called *Shurmallee.*

Chicores and college pheasants were abundant here. Supplies of grain, ghee and milk procurable. We saw here among the trees, large flocks of the beautiful scarlet flycatcher and its yellow female, *(muscipeta flammea,)* as also the nutcracker crow.

Both of these birds are common at certain seasons at *Simla, Mahássú* and other places in the interior. I saw also at this place a fine hill fox.

There is a quarry of very good clay slate at this place, with which the houses in the village are roofed. Supplies of grain are by no means scarce among the villages on this route, and so far from being inconvenienced by the demands of our servants and coolies, as we had been led to expect, they have sufficient to trade upon and send grain of different kinds to *Rampúr* and other places. The country is well cultivated and judging from the appearance of the crops, and the healthy and well clad natives in the villages, the produce must be plentiful.

Having halted a day for our wounded companion we again resumed our journey on the 2nd October up a very precipitous and rocky ascent of several miles, and had rather a fatiguing march, the latter part of the way lying through dense forests with occasional enormous masses of rocks intercepting our path ; caves and traces of bears were numerous. We at length encamped in the middle of the forest with beautiful bold rocky scenery around us. Here, close to us in an opening of the forest was another large flock of sheep.

Whilst engaged in collecting mosses and lichens, which were here very beautiful and growing in abundance on the trees, I was startled at hearing a bear roar at no great distance from me. On returning to camp however, to give notice to the sportsmen of the circumstance, I learned that a shikárí had come suddenly upon the animal which caused him to roar, while he scuttled away in one direction and the shikárí another as fast as their legs could carry them, both wondering no doubt, why his enemy did not seize him ! We failed in finding him again.

The night was very cold and the water froze in the jugs. This day our supplies came from a village called *Thargong*, in the perguna of *Suppael*, at some distance down the *khads* below us, and the zemindar who was a fine ruddy-faced fellow, was very fond of snuff, which he carried wrapped up in a piece of paper, and stuck in the rim of his bonnet. Having a box in my pocket, which was labelled, and had once contained, " antibilious pills," I presented it to him, with which he appeared highly delighted, twisting and turning it about much after the manner of a monkey, and laughing and talking with his companions on his good fortune. He instantly put his snuff into it, took a pinch with an air of some consequence and threw the paper from him ; this was secured by one of his followers, as being very strongly impregnated with tobacco, it answered the double purpose of snuff and snuff-box !

The dress of the people hitherto consisted of the common cloth hill-cap rolled up all round, and the body clothed with blanket fitted close over the breast, plaited round the waist and falling to the knee, like a highlander's kilt ; on their feet they wear a sort of half shoe, half sandal, sometimes made of string plaited like chain work, with soles of the same or of leather ; others are made of coarse hill cloth or blanket and soled with leather.

In cold weather, too, they wear blanket trowsers, wrinkled and close fitting from the ankle to the knee, round which it becomes full and loose so as not to offer an impediment in climbing a hill.

In the tout ensemble of a well dressed hill-man of the interior, there is a rough and independent bearing which added to the distant resemblance in dress, not unpleasingly reminds one of the sturdy mountaineer of old Scotia. In make they are robust and well limbed, with legs that would be far from disgracing even the much loved tartan of the Gael.

The ottah or flour is carried in the skins of goats roughly formed into bags, with the hair left on.

Our march on the 3rd October was long, owing to the scarcity of water, and the path lay one while over dark and frowning rocks with the traces of bears on every side; and at another, through deep forest tracts.

The changes of temperature were here very great, for over the bare rocky pathway the sun glowed with such vigour, that we were compelled to toil up the steep ascents with our coats thrown off, while on entering the forest tracts, the air struck so damp and chill that we were glad to put them on again. At length we halted beneath a lofty hill, called *Callag* or *Carrag*, far removed from any village. On the hill above us we found a bed of juniper bushes, the birch tree and mountain ash, while at the lower ground where we were encamped, currant bushes both black and red were in abundance, and all bearing quantities of fruit, but possessing little flavour.

Here again we found the monaul and also the Cornish chough[5] or red-legged crow (*phyrrocorax graculus*). Bears were very numerous and their traces quite fresh, and covering the ground in the vicinity of the currant bushes, which were broken down and destroyed in many places, in the attempt to obtain the fruit.

After breakfast the next morning we proceeded down a steep and wooded glen, the path often interrupted by a hill stream, over which sometimes we had difficulty in passing; fallen timber also impeded our progress not a little. This glen was thickly wooded the whole way and at last debouched upon a very pretty spot enclosed between high hills. Here we encamped at a small village called *Demrara*, in the perguna of *Bansárr*. Supplies procurable.

Walnuts, peaches and crab apples were here growing wild in the jangals. The chough was very numerous at this place, roosting among the rugged cliffs above our encampment.

In the lower and moister parts of the glen during this day's march we found many plants of the beautiful *mulgedium sagittatum*, a figure of which occurs in Royle's illustrations; the plants were in flower and also bearing seed.

At this place I purchased as a curiosity, a small hookah. It is made of the horn of a wild goat[6] and is one of the simplest and roughest pieces of workmanship I have seen. The bowl is formed of the horn, the largest end of which is stopped with wax and resin, while in the smaller end a reed is inserted to draw the smoke through. On the upper edge of the horn near the broad end, another small reed is fixed which supports an unbaked clay chillum to receive the tobacco.

On the morning of the 5th we walked up a steep ascent to a large village called *Rowul* or *Role* where we rested awhile under the shade of a magnificent horse-chestnut tree.

The temple at this place was ornamented with the horns of the *Jehr* and also of goats. It seems a common practice in these hills, when a person wishes for the birth of an heir or the successful accomplishment of any undertaking, to sacrifice a goat or a sheep to the deity.

The sacrifice is performed by beheading the animal with a sacrificing axe of a particular shape, generally called a *dangrah,*—by Europeans termed a *Jubal* axe, from the circumstance of the best being manufactured in the *Jubal* country, near the *Chor* mountain. The animal when killed is taken home and eaten and the horns hung up at the door of the temple as a propitiatory offering to the *Deví.* There is a temple in almost every village and all have these offerings hanging about them. There is generally also a temple of this kind erected on the summits of the highest hills. On the tops of very high mountains and far from any habitation are often seen piles of stones, such as in the highlands of Scotland would be called "cairns;" these piles are dedicated to *Deví* who seems to be the favourite deity of the hill people*. Every person who has occasion to pass these cairns, or whose piety may lead him to them, places a stone upon the heap as an act of homage to the deity, and when these have become too high to be easily reached others are commenced. On these piles very fine specimens of horns of different animals are placed, and sometimes real curiosities may be purloined from them, but of course by stealth, for the natives would not fail to resent the affront offered to their gods, if they discovered it. We saw these piles, but found no horns. The elevation of *Rowul* is 9400 feet above the level of the sea.

Having rested here awhile, we again ascended a very steep and rocky pass of great height, and after a long and fatiguing march in a hot sun, halted at a village called *Yachlí* or *Einchlí,* in the perguna of *Rájghar.*

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* With good reason, *Párbati* being the daughter of the sacred mountain, (see MILL's *Uma,* J. A. S. vol. II.)—ED.

From this place we had a splendid view of the *Rowal* ghât or pass, covered with snow and distant as a crow flies, about 12 miles. It lay to the left of our route. This pass attains an elevation of 15,555 feet. Some fine horse-chestnut trees and elms overhang this village. The latter trees were sadly disfigured, being little better than tall trunks with knots of young shoots springing out here and there; this is occasioned by the practice of cutting the tender branches and young shoots for sheep and cattle during the winter and other seasons when pasture is scarce.

A few chicores and college pheasants were all the game we could find.

On the 6th we descended into a *khad,* at the bottom of which ran a deep and rapid mountain torrent called the *Undraití* river, which runs down and joins the *Pabbar* at *Shergaon.* This foaming torrent we were obliged to cross on what seemed to us inexperienced travellers a very rude and frightful bridge. It was merely the trunk of a tree with one side shaved flat, thrown across the river at a height of between 40 and 50 feet above the water, which ran roaring and boiling along between two enormous masses of rock. A fall from this rude bridge would in all probability have been fatal, for should a person escape falling on the rock, he would inevitably be carried down by the torrent, and probably receive some stunning blow in his rapid descent, and be drowned before he could make an effort to save himself.

We hesitated for a short time, but finding no place to cross the river except at this bridge, we of necessity took courage and passed over one after the other, by holding the hand of a shikárí who preceded us. Even our hill people hesitated and one man did actually trust himself to the stream in preference. Two sheep attempted to cross but one of them slipping fell over, and was carried down a long way before he could get out again; the other one seeing his companion fall, turned back, jumped into the stream and swam across with some difficulty. The one that fell would not make a second attempt and was carried over on a man's back. Some of our dogs even were carried over!

After crossing this stream we climbed a hill for a few miles, till we came to a spring of water, where we stopped to breakfast and afterwards continued our route to a village called *Cabal* or *Khábar* where we encamped.

The natives of this place differed much in appearance from those of the other villages we had passed. Many of them possessed a good deal of the Chinese cast of countenance, and had the beard and moustache growing in thin straggling tufts. Their eyes too were small and faces flattish. On their heads also they wore a different kind of cap, it being somewhat conical with a kind of tassel or button at the top. Others looked very like Jews and reminded me of the Bohras of *Neemuch*.

Many splendid elms and horse-chestnut trees, as also mulberries were growing here. During the autumnal months, the grass and other plants are cut and made into hay for the cattle during the winter; instead of being stacked, however it is loosely twisted into ropes of some length and then thrown across the branches of the trees near the villages, from whence a rope is taken as required. In other places it is made into small bundles and stuck or *filed* upon a long sharp pointed stake driven into the ground.

The horse-chestnut trees grow to a very large size, throwing out immense branches which yield a shade wide enough to encamp under; in October these trees were all bearing fruit nearly ripe, so that they must flower in spring or early summer. How beautiful must such enormous trees appear when covered with flowers!

We heard from these people that a party which preceded us to the *Bűrenda* pass, had lost three men in a snow storm.

After leaving *Cabal* we proceeded along the side of a barren hill, for some miles, and then gradually descended to a mill stream, where we breakfasted. These mills or *panchakkís* are very numerous on the hill streams near a village, five or six being often turned by the same water, within a few yards of each other.

After breakfast we continued our journey up a very long, steep and rocky height, having a beautiful valley below on the right hand, with the Pabbar river rolling and tumbling along through it, many waterfalls from the precipitous rocks on our right, contributed much to the picturesque beauty of the scene. We found the sun so powerful during this day's march, that we walked without our coats, and at length encamped beneath an immense walnut tree at a village called *Pekha* or *Píkí*.

Here we were presented with a small basket of *Kanáwar* grapes and a quantity of very fine honey in the comb.

Bees are domesticated in almost every village throughout *Bassáhir*, but are not kept in hives in the open air as in Europe; the walls of the houses are made with several small square boxes in them which externally are even with the wall, and give egress and ingress to the bees through a small round hole ; the door of this box or hive opens into the room, by which means the honey is easily taken out, and that too without, as in Europe, sacrificing a great number of the bees, for by blowing the smoke of burning grass or straw into the box through the doorway, the bees are driven out by the external hole, and thus the swarm is uninjured, and a portion of honey being left in the box, soon entices them back again.

In this village was a temple of *Deví* only half finished, and the villagers begged us to give them some quicksilver as they intended to consecrate the building in two days' time, and the mineral was required to complete the ceremony.

On the 8th we started at daybreak and breakfasted at *Janglíg*, which is the last, and according to Dr. Gerard, the highest village in the valley of the *Pabbar*, being 9257 feet above the sea, and is the usual halting-place for travellers, being about six miles and a half from *Píkí;* but wishing to get on we proceeded another march through very pretty woods and interesting scenery to *Lítí*. The latter part of the march, however, was wild and barren enough, no trees growing except a few straggling birches, and these ceased also before we got to *Lítí*, the hills being merely clothed with rank grass and weeds.

Several kinds of rose trees were in abundance in these forests, and on the open hills many beautiful flowers were still in blossom notwithstanding their proximity to the snow and the lateness of the season. The greater part were, however, bearing seed or had shed it. Many flowers which on our leaving *Simla* were only just opening were here bearing ripe seed or had shed it, and the reason is obvious enough, for in these cold and elevated regions winter treads so fast upon the heels of summer that were the frost to set in before the seeds were perfected, plants would be destroyed and thus all animals, and in a few years perennials also, would become extinct : by flowering early and shedding their seeds before the wintery blast has power to hurt them, this is beautifully guarded against! What care and foresight is here displayed by the allwise ruler of the seasons ; what circumstance or event, however minute, however trifling it may appear to us, if the well being of this world be at all dependent on it, is overlooked or disregarded by his most gracious providence ?

I collected great quantities of the seeds of a beautiful yellow flower called by Royle *Corvisartia Indica;* this author gives *Pírpanjál* and *Cashmere* as the habitats of the plant ; I found it in flower on the side of *Hattú* mountain in the month of September and widely spread over the open tracts between *Janglíg* and *Lítí*, bearing seeds, and afterwards at an elevation little short of 14,000 feet, among the snows above *Lítí*, where it was also abundant and in seed.

On this march the traces of bears were frequent. Near *Lítí*, we passed one of the "cairns" above alluded to, and our servants placed a stone on it, passing on the right side of it, which we were informed was always the custom, it being considered unlucky to go the left side.

At *Lítí* is a bungalow, or rather an apology for one, there being windows without glass or shutters, and the two rooms wanting floors and ceilings. It is evident however that the planks of the ceiling have been torn down to furnish fuel for travellers. We arrived late in the afternoon at this drear and desolate abode, which stands in a wild and totally uninhabited valley at the foot of the *Burenda Pass**. The neighbouring and surrounding hills were covered with snow, and rose frowning above us to a great height.

All cultivation and houses cease long before the entrance to the forest, and for seven or eight miles from *Lítí* no traces of inhabitants are seen. The place is well calculated to strike a chill into the breast of a traveller, and tired as we were, with all our coolies in the rear, and with some fear lest they should not come up that night, we looked around us on the still cold scene, with no pleasant feelings.

The sun too, beginning to get low and the sharp cold of evening coming on, with still no signs of our coolies and baggage, we began to think of retracing our steps till we should meet them, and had actually commenced a retrograde movement, when some of the servants came up and told us that the coolies were not far behind, so we went back to the horrid looking bungalow.

Our people at last coming up, we got the tents pitched and gave up the bungalow to our servants, as the night promised to be bitter cold.

The water froze before 9 o'clock at night in our goglets and at daybreak the next morning the thermometer stood at 25°.

The day broke on the morning of the 9th October, with thin fleecy clouds flying about and the villagers who had come on with us from *Janglíg* with supplies of ottah, and who were in the habit of crossing the Pass, advised us not to attempt it that day, as it is always dangerous when clouds are about. We therefore deferred our journey,

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* This pass, generally known to Europeans as the '*Burenda Pass*,' is called by the natives *Booren ghátti* and *Brúoang ghátti*. The last name is derived from that of a village on the *Kanáwar* side.

We therefore deferred our journey, and ascended another hill overhanging *Líti* on the right bank of the *Pabbar* from the top of which is a waterfall, forming a stream which running down past the bungalow gives it its name of *Líti* or *Lítung*, and empties itself into the *Pabbar*.

Near the top of this hill we crossed an immense bed of junipers, bearing flowers and berries with the same strong flavour as those of Europe. These were growing at an elevation little short of 14,000 feet and above the lowest line of snow, yet here among the moss scattered beneath them, I found shells of the genera *Nanina*[4] and *Bulimus*. The difference between these and others apparently of the same species which I discovered at *Mahássú* and *Hattú* consists in size only.

In the former localities they are larger and less ventricose in the whorls, but the colors and markings are the same, as it would also appear are their habits, for at this spot, where snow lies for a great part of the year and which borders on the regions of eternal snows, the animal closes the aperture of the shell with the same thin gumlike substance as those of the warmer hills of *Mahássú*.

From *Liti* to the waterfall, is a steep and somewhat difficult ascent, of about 2000 or 2500 feet, after which a flat piece of land walled round with lofty snow-clad peaks, presents itself, through which the stream that supplies the waterfall, and which owes its origin to the snows above, slowly winds along.

Here I found some beautiful flowers growing among the moss and lichens above which they scarcely peeped, as if afraid to lift their heads into the chill and desolate region around them. Some of them occur in Royle's work on the Himálayan Flora such as "*Dolomiœa macrocephala*," which was abundant and in flower! and "*Corvisartia Indica*," widely spread and in seed.

Numbers of shrew mice (*Arvicola*) are found at *Líti* and high up the hills around it, as also a species of marmot[6]. This latter is about the size of a large rat, but the countenance and general formation externally have more the appearance of a young rabbit than a rat, especially as the tail, so conspicuous in the rats, is wanting in this little animal. One of these we were fortunate enough to capture; the length was scarcely six inches. Upper incisors with a deep groove; fur above deep gray like a rabbit, with a reddish tinge over the head, shoulders and sides. Whiskers very long. Ears rounded. It seems most nearly to approach the *Arctomys Bobac* of Desmarest, or *Mus arctomys* of Pallas, which is said to be found in *Poland* and northern *Russia*, but the length is given as 15 inches, whereas this is barely six.

They burrow like rats on the side of the grassy hills. Some of our party said they saw much larger ones than that above described, in which case there were two kinds, as our specimen, judging from the teeth, was decidedly adult.

Royle figures an animal very similar to this, which he obtained from the *Chor* mountain, under the name of "*Lagomys Alpinus*," Desm. or "*L. Pika*," Geoff.

I hesitate to decide whether our animal is distinct from that of Dr. Royle because the specimen was so stiffened and dried when I had leisure to examine it, that I could not ascertain whether the incisors were those of *Lagomys* or *Arctomys*, and it is possible that what I considered a groove in the upper incisors, may be the separating line of the teeth, and in this case I should consider the animal identical with Royle's. I shall soon be able I hope to decide, as men are gone in search of specimens, both to the *Chor* and *Burenda Pass*.

After staying a short time in this dreary spot and collecting as many seeds as I could conveniently carry, I followed the rest of the party who had already got far on their way down again, for the clouds had now gathered all round very heavy and promised a storm; the wind too became high and bitterly cold and very shortly after we had regained our tents, we experienced a fall of hail, while up the dreaded *Pass*, the snow was falling fast and made us sensible of the risk we should have run in attempting to cross it on such an uncertain day.

After the storm, which did not last long with us although the pass continued obscured and hazy, I went a short way up one of the hills to gather the seeds of some plants I had observed in the morning, and was in a shower of snow all the time; some of the party went up another hill a little way and experienced the same thing, while around our tents it was all clear again.

The seeds alluded to, were of a pretty little plant very abundant near *Líti* bungalow, called by Royle "*Gualtheria nummularioïdes*;" the seed-pods were of a bright blue color, and as numbers were growing on the same plant, they had a very pretty effect, peeping half hidden from behind the small dark green leaves. Here, also, I found a large bed of wild shalots.

At night it became very cold and a sharp frost set in; the thermometer at daybreak again standing at 25°, and at sunrise or when the sun topped the easternside of the *khad*, it stood at 29°.

10th October. Thin clouds were seen as yesterday, but owing to a good deal of discussion having taken place the previous evening, we determined to try the *Pass*, intending merely to look over it and return.

For this purpose we took a guide and started. The path from *Lítí* wound along the side of a bare hill through a glen, which gradually became more confined and rugged, as we neared the *Pass*. On either hand, steep precipitous rocks towered above us to the height of about 3000 feet; near their base on the left of the *Pabbar* a few straggling birches were seen, and not far above them commenced the snow which became gradually deeper towards the summit of the cliffs. Along the bottom of this narrow glen, ran the *Pabbar* river, roaring and foaming as it dashed along over the rocks and stones, in its rapid and headlong descent from an immensely thick field of snow, to the left of the *Pass*, from which it takes its source. The end of this frightful glen is closed by the *Burenda* or *Bruang Pass*, whose highest peaks tower up to the height of 16,000 feet above the level of the sea.

Our guide watched the sky very narrowly during our approach to the gorge, and did not seem to think we had chosen a very favorable day for our ascent. Every thing was calm and still as death, and not a living creature was seen save the little marmot darting into its hole and the vulture-eagle roaring aloft over the snow-clad rocks. As we advanced however we heard the heavy sound which in mountainous countries often foretells a storm, and which I had heard on the preceding day. Similar sounds are emitted by some of the Scotch hills as *Bein-douran* in Glenorchy, and even the great falls on the river *Tummel* north of *Shichallain* are said to give warning of the approaching tempest*. The highlanders call this the "spirit of the mountain shrieking," and our guide seemed to entertain some idea of the kind, for he stopped and, turning to us, said something in his unintelligible hill patois, which to us sounded like, mallah banch bolta hai†."

Far above us, among the snows that crested the rocks to our left, we saw some of the *Bharal*[6] or wild sheep which are only found in the most inaccessible places.

We had now ascended some way and our breathing began to be affected, obliging us occasionally to pause and rest.

Before us lay the *Pass* now plainly laid open, and beneath it, to our very feet, was spread a bed of broken and disjointed rocks of every size, hurled together in wild confusion from their original position on the heights above by the combined effects of frost and heat, each succeeding year apparently adding something to the general wreck produced by the wintery warring of the elements since the world began. Over these disjointed masses was spread an almost unbroken sheet of driven snow, which concealing alike the rocks and chasms beneath, proved a difficult and somewhat treacherous path.

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* STEWART'S History of the Highlanders.

† Although we made him repeat the words several times, we could make nothing of it, and therefore construed them after our own fashion, viz. that "*Mother Bunch* was speaking!!" The guides declared that when these sounds were heard thrice during the day, i. e. morning, noon and evening, it was a sure sign of a storm or bad weather. [Queré *Himála* '*bach*' *bollá hai*, 'the mountain cries 'escape.'—ED.]

Whilst pausing here to take breath, we espied something red lying beneath a ledge of rock at no great distance from us, and sending a man to reconnoitre, found it to be a human body rolled up in a red rezaí and frozen to death!

Our guide now without speaking, resumed the path at a quick pace as much as to say "make haste, or you see what might happen." We followed and a very few paces again brought us to another frozen victim lying on our path.

His head was bound up in his waistband and part of it drawn across his eyes, as if to protect them from the driving snow, and he had fallen apparently exhausted on his back, with the left arm outstretched and the hand clenched; one leg was drawn up and much cut by the stones among which he lay, while the other was extended. The mouth was open, but the eyes were partly closed, probably from the pressure of the bandage over them. These two poor wretches were part of Dr. Powell's attendants of whose loss we had heard at *Cabul.* Soaring round above the body were a pair of vulture-eagles[*], who seemed waiting for some assurance that life was extinct ere they ventured to descend to their repast. The body was still fresh and emitted no stench whatever, owing to the coldness and elevation of this desolate region, although it must have lain there for at least a fortnight, the party having been overtaken by a snow storm about the 26th of the previous month (September) at which time we had rain at *Nágkunda* and remarked the unsettled appearance of the weather over the snowy range. The bearded vulture waited but for some token of decomposition to pounce upon his prey, and until such took place, (so healthy appeared the body) he could not distinguish between sleep and death!

Is not this additional evidence that, "sight and scent combined," are the means by which the vulture is directed to his prey? His quick eye had rested on the prostrate form below, but effluvium was wanting to assure him that the banquet was prepared.

The sight of these poor frozen wretches, apparently in rude health at the time of their death, damped our spirits a good deal and we pushed on towards the summit, now fully convinced that the stories we had heard, of the dangers of the *Pass*, were but too well founded.

Three of our party had reached the top, but I was still about 200 yards from it, feeling so sick and my head aching so much from the reflection of the sun on the snow, over which we were climbing, that I could not walk fast, which the guide perceiving he at once said, " We cannot wait here, so come down," and away he went, followed by the party who had gained the summit, for the clouds had gathered thick and fast during our ascent and promised a storm. On passing me, they warned me to turn and I nothing loath obeyed them instantly.

The time occupied in ascending and returning was about 4½ hours, and we had scarcely arrived at the encampment, when snow began to fall, and sick of the spot from the frightful and desolate scenes we had witnessed, orders were at once given to strike the tents and we marched off towards the forest on the road back. Never was an order more cheerfully obeyed or an encampment more speedily struck than was ours, and a smile gladdened the face of each shivering coolie as he trudged along beneath his burthen, from those regions of gloom and death.

Hail and snow fell occasionally during our march and at last we halted for the night in the forest about six miles from *Líti*, having walked at least eighteen miles during the day, and all right glad to get away from the horrid place we had left.

It afterwards proved that we had not left the Pass a minute too soon, for the next morning the ground was white with snow as low down, as our encamping ground at the bungalow! The forest near *Líti* abounds with game of the pheasant tribe; we did not stay to shoot however, as we were anxious to get back to *Simla*, some of the party being obliged to return to the plains. A monaul was killed and several others heard as also plass. A bear too was followed by a shikárí but without success.

On our return from *Líti* we fell in with three or four men from *Janglíg* all carrying skins of attah on their backs; they told us they were going across the *Pass* into *Kanáwar* to barter their flour for salt which they sell to the neighbouring villages. That night they would sleep near the foot of the *Pass* beneath some bold projecting rock or at the bungalow, and push across the next morning while the weather was fine and the day before them. The storms seem to gather and break about the turn of the day, or one or two o'clock in the afternoon.

On the morning of the 11th October we proceeded to *Janglíg* where we again stopped to breakfast after a downhill march, beneath a grove of large elm and horse-chestnut trees. Here we found immense quantities of small garnets imbedded in the mica slate with which the walls are built. After breakfast we proceeded down a very steep and rocky road to the banks of the *Sapan*, a stream which empties itself into the *Pabbar*, and over which is a tolerable sankho; from this our road lay through a very beautiful glen on the banks of the *Pabbar;* it was thickly wooded and by the side of the path many beautiful flowers were growing, and among them several species of *impatiens* or wild balsam, one of them of a pure milky white.

This day we encamped again at *Píkí* which has an elevation of 8759 feet. The distance from *Janlíg* is about 6½ miles.

From *Píkí*, instead of retracing our steps to *Simla*, by the route we had come, i. e. keeping the heights and marching across the ridge of the hills, we proceeded by the regular road down the valley of the *Pabbar*, which is a most beautiful and richly cultivated country, with the river from which it derives its name running through it. The crops are chiefly rice and are abundant. Pulse of several kinds is also grown here.

From the accounts we had heard, before leaving *Simla*, of the poverty of the natives and the scarcity of supplies in the interior, we were prepared to see a country almost void of cultivation.

This, however, is far from being the case, and in the valley of the *Pabbar* especially, the luxuriance of the crops could scarcely be exceeded. Indeed, throughout our trip, nothing could be more opposed to such an idea, the natives stout and healthy in appearance, their clothing good, and crops luxuriant: every thing in fact bespeaking abundance. That they have sometimes little to spare to travellers, does not arise from any want of necessaries, but is solely attributable to their sending all the grain out of the country, keeping merely sufficient for the wants of themselves and families, and exporting the surplus which is great, into *Kanáwar* and the higher states where grains are not so easily cultivated, and where therefore they find a ready and profitable market. This surplus is either sold, or bartered for salt and other necessaries. Their rents, too, are often paid in kind; that is, in the produce of their lands. Thus it not unfrequently happens, that the very people who are striving to impress upon the mind of a traveller, that they are pinched by want and poverty, are in fact comparatively rich, and this dissimulation is prompted by their avarice as an excuse for extorting a heavy remuneration for the pittance doled out to him.

Proofs of this occurred to us more than once when we had occasion to demand supplies for two or three days, for, by offering an advanced price very little difficulty occurred in furnishing the necessary quantum.

In the valley of the *Pabbar* the standard grain is rice, which is either sold or bartered in *Kanáwar* and *Nawur* for salt and iron. The *khĕts* are well irrigated by the numerous rills and mountain streams which flow down to join the *Pabbar*, thus causing little, or none of that hard labour, which falls upon this class of cultivators in the plains of India. In lands which are warmly situated and where two crops are produced, the principal grains are barley and several species of millet; the former is sown in March and April, and gathered in July, when the land is again made ready for the reception of the other grains, which are reaped in the autumn. In higher and less favoured situations and where only one crop can be perfected, the celestial and common barley, wheat and millet are sown in spring and reaped in September and October. Many other grains are also extensively cultivated, such as *bhattu* (a species of *amaranth*), cheena and *kodah*, *(panicum miliaceum* and *paspalum scrobiculatum.)* Besides these, various garden vegetables are cultivated in small quantities for home consumption.

The fruits are walnuts, apricots, wild quinces, peaches, and plums, none of which however are of any value owing to neglect and want of pruning and seldom ripen in the higher tracts. In a country where such endless varieties and gradations of climate and soils are at command, these and many other fruits might with little trouble be successfully cultivated and yield both a useful and profitable addition to their diet and exports.

The valley of the *Pabbar*, downwards from *Janglíg* is so level and presents so few difficulties, that, were encouragement given to the project, a line of road might possibly be traced out, through the valleys of the lower hills and made to debouche upon the plains. This if once effected would enable hackeries and other wheeled-carriages to penetrate to within two marches of the *Burenda Pass*, or as far as the village of *Píkí*, and offer a readier and cheaper means of conveying the products of the interior to the plains, than the present slow and expensive mode of carrying every thing on men's backs. So also the produce and luxuries of the plains would contribute in no small degree to the refinement and pecuniary advantage of the rude mountaineers, and by giving them a more extended field for speculation, encourage them to throw aside their idle habits and turn the mineral and agricultural resources of their yet almost unexplored countries to some account.

The articles of barter and sale among themselves, and their exports, consist now of wheat, common and celestial barley, bhattu, rice, ogul opium, tabacco in small quantities, tar, turpentine, kelu oil, apricot oil, raisins, currants, ginger, neozas, iron, borax, salt, leathers and skins, chowries, blankets, woollen caps, shawl wool, potatoes, tea, and honey. The wax, too, if separated from the honey, would be an additional and abundant article; at present it is mixed up and eaten with the honey by the natives. Iron though abundant in some parts is nearly doubled in price by the time it reaches the plains owing to the mode of conveying it by coolies and the taxes levied upon it by the chiefs through whose states it has to pass.

The cattle on this side the *Himalayá*, consist of a small herd of cows and oxen, mules, sheep and goats. The sheep are pastured over the open grassy tracts of the upper hills and constitute one of the chief sources of profit, by furnishing good wool for blankets and other woollens, both for export and home consumption. Oxen are used in ploughing in the valleys, and on the hill sides when not too steep, but where the slope is great or the space confined, the ground is dug and cleared by the women, on whom indeed almost all the drudgery devolves, the men, when not engaged in transporting the produce of their farms, preferring to make woollen shoes, caps and blankets, or to lounge about idle in the villages.

That these mountains contain mineral treasures of no mean value there can be little doubt, and were research encouraged in this branch, some important results might ensue.

To some valuable discovery, made near the *Gangtung Pass* on the road from *Dabling* to *Bekhur* on the confines of Chinese Tartary, the hints dropped on his return, by the enterprising traveller M. JACQUEMONT, no doubt referred; why else, should he have evinced so much anxiety to prevent any European from visiting that quarter, until he should be able to make known his discovery to the French government and return under their auspices to avail himself of it?

Report says, that he earnestly entreated Major KENNEDY, not to allow a European to visit that *Pass*, until his return, and added that he "hoped whoever attempted it, would fall over and break their necks*!!"

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* "If an Englishman go thither, never mind;—but if a German or a French naturalist visit it,—give your guide a hint to walk him over the precipice"—was the expression, in *badinage*, of the enthusiastic traveller; certainly betokening

What the discovery was he would not divulge, but from his eagerness to shut that route to future travellers, it was doubtless of importance.

Particles of gold occurring in some of the hill rivers would lead to the conclusion that it must exist in the rocks, through which these rivers sweep, and becomes detached by the rush of waters. That gold therefore, was the discovery hinted at, is neither impossible nor improbable. It is certain that none but the precious metals would have been worth the notice of the French government.

The subject is perhaps worth inquiring into and research directed to that quarter, might bring the hidden treasures to light.

After breakfasting on the road at the same mill stream we had stopped at in coming, we pushed on as far as *Shèrgaon,* where we encamped for the night after a walk of about eight miles through a lovely valley. The village of *Shèrgaon* stands at the point of confluence of the rivers *Undraitee* and *Pabbar.* The former stream runs down through a valley of rice fields, the produce of which is held in much estimation and is reserved, we were told, for the use of the rája of *Rampore* to whom the country of *Busahir* belongs. Several of the houses in this village had small patches of flower ground, and the "Marvel of Peru" with its various colored flowers was very abundant.

On the 13th of October we left *Shèrgaon* and proceeded 11½ miles to *Rúrú,* intending to breakfast on the road, but so well was every inch cultivated that we could find no convenient place to pitch a tent, and were therefore obliged to wait till we arrived at the village; we afterwards marched four miles farther, leaving the regular road and striking up again to the heights on the right of the valley. The whole of the march from *Shèrgaon* to *Rúrú,* is most luxuriant in rice crops, and the appearance of the natives bespeaks abundance.

Between these two places we met several Sikhs who reside in these parts and carry on a traffic with the plains.

Our camp was pitched near a small hill stream from which some fishermen brought us a dish of delicious trouts. They catch them in rather a novel manner, placing across the stream a long rod on which are fastened at short intervals a number of hair nooses, into which

that he had some curious discovery (probably of fossils) of which he would secure the first honors; and affording an amusing estimate of national curiosity.—Still is it not confirmed by the fact that no Englishman has since sifted the nature of JACQUEMONT's interest in that spot?—ED.

the fish are driven by a man who gets into the stream and turns up the stones as he approaches the rod.

From their attitude, we at first thought they were tickling the trout as they do sometimes at home. I have seen the same fish brought from a stream below *Subathú*, and they appear to be identical with that described by Dr. McClelland as the mountain trout of *Kemaon*.

The mode of capturing them is, however, somewhat more ingenious than that mentioned by him.

Chicores and black partridges[5] were abundant at this place.

On the following day we continued our journey up the hills, breakfasting as usual on the road and encamping, after a long and steep ascent the whole way in a hot sun, on an open hill about five miles from our old encamping ground at *Tútú*.

Monauls, plass and chicores abundant.

On the 15th October we proceeded through a thick wood over very slippery paths and encamped once more at *Tútú* on the heights.

Here we found a man who had come from our last encampment to beg for some remuneration for the loss of a fine hill dog which guarded his flocks. One of our party had been chased by him, while shooting near the sheep fold, and finding a volley of stones insufficient to keep the animal from seizing him, he was at last obliged to fire in self-defence in the dog's face, from which the man said he was dying.

As a dog of this dog kind is invaluable to these poor people, he received a sum of money to enable him to purchase another and went away quite satisfied.

From *Tútú* we went next morning to *Bagie* where some of the party found their ponies awaiting them, and after breakfasting and resting awhile we continued our march, skirting *Hattú* and at last arrived once more in safety at *Nágkunda* bungalow.

At this place two of our friends left us on the following morning on their way to *Simla ;* the remainder of the party halted here one day, and on the morning of the 18th October walked to *Mattiána*, through the forest across the tops of the ridges, which is a shorter and more beautiful route than by the made road.

Numbers of monauls and plass pheasants were put up and also a musk deer.

After breakfasting at *Mattiána* which we reached after a walk of $3\frac{1}{4}$ hours, I also deserted and made the best of my way to *Simla* where I arrived on the evening of the same day.

Miscellaneous and Zoological notes to the Journal.

[1] *Flowers.*—Among the most common are the "*Anemone discolor,*" "*Potentilla pteropoda,*" "*P. Cautleyana,*" "*P. Saundersiana,*" "*Chaptalia gossipina,*" "*Parnassia nubicola,*" "*Campanula cashmeriana*" and "*Hermineum gramineum,*" of Royle. These are found at *Simla* and for several stages into the interior. Also a species of Columbine (*aquilegia vulgaris?*) and that curious flower "*Ceropegia Wallichii.*"

[2] *Lepidoptera.*—Butterflies.

Fig. 1.* "Swallow-tailed butterfly;" "*Papilis machaon.*" This is found at *Simla* and in the interior. It does not appear to differ from the European insect.

Fig. 2. Is a species which was captured in the *Serdree* jangals, near *Neemuch* and is now in my cabinet; it is here figured to show the approach to the "scarce swallow-tailed butterfly" of Europe, "*Papilio podalirius*;" it is, however, smaller than that insect and wants the eyes or ocellated marks on the wings, and it differs also in the distribution of the dark bands. It is probably not unknown to science, but is figured to show the affinity to "*P. podalirius,*" and with the hope that some naturalist may favour me with its name, as I have failed to recognise it from descriptions.

Fig. 3. "Tortoise-shell butterfly;" "*Vanessa urticæ.*" The larva feeds on the nettle and is like that of Europe; it is found in May and again in July. The chrysalis or pupa is suspended by the tail. This is one of the commonest and most hardy of the Himálayan insects, and is found all the year round, winter not excepted.

Fig. 4. "Painted lady;" "*Vanessa cardui,* (*cynthia.*)" This is also common and found throughout the year like the last. I have seen both and also *Vanessa polychloros,* sporting in the sun, even when the ground was covered with snow. It also occurs very plentifully at *Neemuch* during the rains.

Fig. 5. "Large tortoise-shell butterfly;" "*Vanessa polychloros.*" This is not so common as the small species, but is also a hardy insect, and may be seen during the winter months, sporting about in the sunshine.

Fig. 6. "Himálayan admiral;" "*Vanessa Vulcania.*" This is very closely allied to the European admiral, but the Rev. Mr. Bree, who compared the insects in England, seems to think them distinct. See *Loudon's* Mag. Nat. Hist. from which I have copied the figure. It is not uncommon during the summer months. It occurs also at *Neemuch.*

"*Argynnis Aglaia.*" This is only met with during the summer and early autumn. It scarcely differs from the European insect.

Fig. 7. "Marbled white butterfly;" "*Hipparchia galathea.*" This is found during summer and early autumn. It is a variety only of the European insect.

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* We are reluctantly obliged to omit the plate (or rather two plates) of these illustrations. Without color, however, justice could not be done to them.—Ed.

Figs. 8 and 9. "Large cabbage butterfly;" "*Pontia brassicæ.*" This is a very common species, appearing in March, April, May, June, and July. In the latter month it is scarcer, as are all the hill species, owing to the constant cloudy and rainy weather. The larva feeds on the cabbage, turnip, and other plants.

Figs. 10 and 11. "Small cabbage butterfly;" "*Pontia rapæ.*" This is also a common species during the summer months.

Fig. 12. "Brimstone or sulphur colored butterfly;" "*Gonepteryx rhamni.*" This beautiful insect is very common at *Simla* and the interior. It appears as early as March, and is one of the latest on the wing in autumn. There is another species or variety found here in March and April, which has the superior wings of a bright sulphur like the male, and the posterior wings nearly white as in the female.

Fig. 13. "Black-veined white butterfly;" "*Pieris cratægi.*" The most numerous of all and of every size during May and June. The pupa is supported by a silken band round it.

[3] *Coleoptera.*—Beetles, *Lucanidæ,* or stag-beetles. Royle figures a fine species of stag-beetle, which is not uncommon at *Simla* in July, under the name of "*Lucanus lunifer.*" The female is not given, but in color it is the same, wanting as usual the large jaws of the male, and being inferior in size; both sexes are highly pubescent when recently and carefully captured.

The color is a deep olive brown; head, thorax and elytra thickly clothed with soft hairs of a pale mouse color. The jaws of the female are short and stout with a square tooth in the middle. The legs are all spiny. Length of the male from the tip of the jaws two inches and a half; female one inch and a half. In addition to these I have collected here and at *Mahássú,* four or five other species.

The food of the *Lucanidæ* being yet but imperfectly known, although it is supposed to be the sap of trees, it may not be amiss to remark that I have repeatedly found them feeding at the base of oak trees, their bodies half buried in the earth, wounding the origin of the roots with their jaws and greedily sucking up the juice as it exuded.

Cerambicidæ, Capricorn Beetles. I have taken more than 20 of the larvæ of one species out of a decayed oak tree. The insect which destroys timber in the plains, which is often heard gnawing in the legs of tables and chairs, and usually known by the name of the "Carpenter" from the noise it makes in boring; is the larva of a species of Capricorn beetle.

Elateridæ, click beetles. These are the beetles, that, when laid on their backs, can by a sudden jerk of the head and thorax, throw themselves again on their legs. In my school-boy days, they were known by the name of "backjumpey."

There is a very common beetle at *Simla* during the rainy season, which I believe to be the "*Scarabæus Phorbanta*" of Olivier's insects. It is chiefly found in heaps of cow-dung. Olivier gives *Senegal* as the habitat, but his characters which I subjoin, agree so closely with my insect, that I must consider them identical.

"Scarabæus scutellatus, thoracis cornu incurvo apice bifido, capitis recurvato bifido.

"Scarabæo gedeone paulo minor; capitis cornu recurvo apice bifido, absque dente. Thorax niger, lævis, nitidus, cornu magno, porrecto, incurvo apice bifido. Elytra lævia, brunnea : differt à Scarabæo gedeone, cornubus minoribus absque dente."

These characters are so good, that a description of my specimen would be but a repetition.

The female is similar in colors, but has no horns on head or thorax. They emit a squeaking noise when touched, which proceeds, as in many other species, from rubbing the extremities of the body and the elytra together.

These beetles differ considerably in size and in the development of the prominent projection of the thorax, some having it large and well defined, while others have scarcely any signs of it. And yet though they thus differ, they must still be regarded as one and the same species, because all couple with the same females, which also differ much in size. This difference arises from the various degrees of nourishment which the larvæ have procured, for those which obtain a plentiful supply of food, will grow to a much larger size than those which have been stinted in this respect.

The many varieties of a species arise chiefly from such causes, as a scarcity of food and prematurely becoming pupæ, (which change many undergo on finding their supplies exhausted.)

The pupa also, may be placed in an unfavorable situation, and therefore will not produce so fine a specimen as one which has been more fortunately placed. The pupæ of beetles, and perhaps, of most kinds of insects, which are buried in the earth require a moderate degree of moisture to bring them to perfection, and it may be said that even in this state, the animal receives nourishment.

In proof of this, I took a number of the grubs or larvæ and the pupæ of the present species, as well as of some other kinds, and placed them in a box of earth similar to the soil in which they were found. Many of the larvæ died from not finding sufficient nourishment, while others which were in a more forward state, became pupæ, but these were always much smaller than those which had been full fed.

The beetles produced from these were consequently small and the development of the horns very slight. The full-formed pupæ which I had taken, were placed, some *in* moist earth and some *on* the *surface* of it. Those which were buried and received nourishment from the soil, produced fine healthy beetles, while on the other hand those which were on the surface or only partially buried, produced imperfect specimens, the wings being shrivelled up and never coming to maturity, while again numbers of the pupæ dried up and never produced anything.

This circumstance satisfied me that nourishment was as necessary to the pupa, as to the larva and imago, and although the two latter alone take food, yet moisture and warmth are felt and imbibed by the pupa, and are as necessary to the formation or production of a perfect and healthy insect, as food is to the larva. If moisture be withheld, the skin of the pupa shrinks and hardens and the insect has not room to expand and perfect its parts.

From this cause I am led to believe that many varieties, have been unnecessarily raised into species and described as distinct.

The mere circumstance of their differing in size and proportions can never really separate them ; as well might two brothers be deemed of distinct species because the one happens to be six feet in stature and the other a dwarf. Such a comparison is by no means absurd, because many of the ova deposited by our female, will eventually produce large and well-formed insects, and the rest produce their diminutives. These, therefore, can never be received as more than mere varieties of each other, and indeed I can scarcely consider the offspring of the same parents as varieties at all. The offspring of two females of the same species may possibly be reckoned as varieties of the same, should they happen to differ ; but surely the hildren of one mother, produced at one birth, must be to all intents and purposes one and the same species.

Thus when two insects of the same species differ merely in size and the greater or lesser development of horns, spiny or other processes, they may be termed "Varieties." But a difference in structure, habits, food or general economy would alone authorize their being classed as distinct species. By difference in structure, I would be understood to mean, of different forms, because the mere circumstance of a horn or spine being greater or less, in some, than in others does not constitute a different, but only a greater or less development of the same structure.

It is perhaps a remarkable fact, that almost every species of *Coleoptera*, has its diminutive, and the only way, in which to account for this lies, I think, in the abundance or scarcity of proper nourishment they receive in the larva and pupa states.

While speaking of insects, it may be as well to observe that it has hitherto been received as a rule, that sexual commerce is unknown to the larva state ; this rule cannot now wholly apply, as during the past year, I have repeatedly seen the larvæ of a species of grasshopper in connexion during the summer months, at *Simla*.

4 *Land Snails.*—Two species of *Nanina*, one (or two) of *Bulimus* (reversed) and one of *Clausilia*, being new to science, will, with many others, shortly be described in a separate paper and submitted to the Asiatic Society. "*Clausilia elegans*," nobis, is sadly destructive to the oak of these mountains, which they seem to prefer to all other trees. They bore into every crevice and live in the rottenness they have created, grinding and reducing the fibre of the wood to the consistency of wet sawdust.

In the 3rd No. of the Journal of the Asiatic Society, Dr. Royle observes, that the shells of these mountains do not differ from those described by Mr. Benson as occurring in the Gangetic provinces. Of twenty species which

I have been fortunate enough to discover since my arrival at *Simla* in 1836, there is perhaps only one species identical with those of the plains, all the others I believe, being new to science. It is not very surprising, however that Dr. Royle should have committed this error, because the shells I allude to, being of retired habits and only found in situations, to which his pursuits would scarcely lead him, would of course escape observation, whereas the species which probably led him into error, is found, during the rains creeping up every plant and shrub, and is the most numerous of any species. It is the "*Nanina vesicula*," of Mr. Benson, found by him at *Rajmahal*, and by myself at *Neemuch*. It is abundant from *Monee majrah*, at the foot of the hills, to *Simla* and *Hattú* mountain (10,656) and probably farther into the interior.

I found a reversed species of *Bulimus* at the *Burenda Pass* at an elevation little short of 14,000 feet, which I imagine is higher than the living species have ever yet been found.

[5] *Birds.*—Plass or Pucras pheasant; "*Euplocomus pucrasia.*" This bird is called by the hill people in different parts, plass, pokrass, koklass and kokrass. They are usually found in pairs and are rather shy birds. They do not bear confinement well, but pine and die in a short time. A very indifferent plate of this beautiful species occurs in the Naturalist's Library.

The breeding season is the latter end of April and all May.

College or khallidge pheasant, "*Euplocomus albocristatus.*"

This is called the college pheasant, but oftener "*Múrghi*" or fowl, by the hill people. They thrive well in confinement and might with a little attention be added to the poultry yard. Their flesh is white and delicate. The tail feathers of the male bird are somewhat arched and approach in this respect the genus "*Gallus.*" The tail is generally elevated when the bird is in motion.

These are the most abundant of the pheasant tribe in the hills and are often seen in small parties. They seem to frequent moist and wooded *khads*, whereas the plass prefers the heights. In the winter numbers are brought to *Simla* for sale at three or four anas a piece.

They breed, as the last species.

Monaul, or Bunaul; "*Lophophorus Impeyanus.*" This and the two foregoing are common from *Nágkunda* to the *Burenda Pass*. In the winter they come down close to *Simla*. They prefer forests on the hill side, in which is plenty of brushwood. They are not difficult to tame but do not live long in close confinement owing to the want of proper roots, &c. which in a wild state they are very fond of.

They breed in May.

As specimens, these and the above birds, are not worth shooting from the month of June until October, during which time they are in moult. The note of the male is a loud and musical whistle which he repeats quickly when alarmed.

They may be ascertained to be in the neighbourhood, by the holes they dig with their bills in the ground, in search of roots and insects.

In addition to these three pheasants, are found the "*Cheer*" and "*Jahgee*" or horned pheasant. The latter is only procurable during the winter season, and that only in the interior, near the snow. The shikárís who bring them stuffed to *Simla*, say that, as the winter becomes more rigorous above, these birds descend before the snow; they are inhabitants of the higher and colder regions of *Kúlú* and *Bhotan*. They live in pairs, it is said.

The only species brought to *Simla* is the "golden-breasted Tragopan" (*Tragopan Hastingii*). It is known here as the Argus pheasant. The young males have the plumage of the female, with a rufous throat.

The "*Cheer*" is a beautiful bird and has more of the character of the true pheasants, than any of the others; it is found in the neighbourhood of *Simla* during winter and is not scarce. Their food consists of acorns and other seeds, as also insects. The largest bird in my collection (and I believe in *Simla*) measures in length from the tip of the beak to the end of the central tail feathers, forty-four and a half inches.

Another bird called the *Bhyre* or *Bhair* is found on the verge of the snows during winter but the shikárís say, they know not where it comes from. They live in covies like the chicore (*Perdix Chukar*), but are much larger birds. The plumage somewhat resembles that of the *Ptarmigan* in its summer plumage. By some it is called the "Ladak partridge."

Chicore; "*Perdrix Chukar.*" These well known birds are numerous on the sides of bare hills near cultivation. They are easily detected by the noise they make in calling to each other. They are good eating and are sold during the winter at two anas a piece.

Black partridge; "*Perdix Francolinus.*" These birds are by no means scarce in the hills, but they confine themselves to *khads* near cultivation.

Woodcock; "*Scolopax rusticola.*" Is found at *Simla*, *Mahássú* and *Fágú* in *khads* near water-courses. It is probably also to be met with farther into the interior. The time of arriving at or leaving these places is unknown, but I have seen them at *Mahássú* in the beginning of August, and have had them brought to me from *Fágú* in April. It is therefore not improbable that they remain throughout the year and breed in the last mentioned places, that is in the forests of *Mahássú* and *Fágú*, where, ascending to the heights or descending into the depths of the *khads*, they can very sensibly change the temperature. At *Simla* they have been found in November.

Three species of the *Scolopacidæ* mentioned by Mr. HODGSON in the GLEANINGS IN SCIENCE as inhabiting *Nepal*, are found here and in the interior; viz. the woodcock, *(Scolopax rusticola;)* woodcock snipe, *(Scolopax gallinago,)* and the solitary snipe *(Gallingo solitaria)*.

I have not been able to learn as yet that the common snipe *(Gallinago media)* is found here.

Chough or red-legged crow; "*Phyrrocorax graculus.*" These do not appear to differ from the European birds. They are numerous among the rocky heights of the interior, from *Carrag* to the *Burenda Pass*.

Bearded vulture or vulture-eagle; "*Gypaetos barbatus?*" These birds are common at *Simla*. I do not think they are identical with the European bird, and shall shortly have occasion to mention them in a separate paper.

⁵ MAMMALIA.—Leopard. *Felis Leopardus.*

One of these animals entered the bedroom of Lieut. PENGREE 39th regiment, N. I. and seized a bull dog that was chained to the bed. During the struggle the chain was broken in two places, and Lieut. P. starting out of his sleep and seeing his pet dog beneath the leopard, he, without reflecting on the danger, instantly threw himself upon the animal and clasped him in his arms. Receiving a scratch from the brute's hind legs, *as a notice to quit*, he thought prudent to let go, when the leopard sprang through the door and escaped. The dog which was a powerful animal, was scarcely hurt.

I have a fine specimen which was shot by some villagers near *Simla*, who said he had destroyed several cows. He was a large male and rather exceeded the size given by FRED. CUVIER.

All animals should be measured previous to skinning them, otherwise an accurate statement in this respect can scarcely ever be given, as sometimes they are stretched in the process, and at others, have shrunk in the curing. The colors also should be noted previous to curing the skins or they are very liable to undergo considerable change.

Leopard Cat. *Felis Nepalensis; vel. Bengalensis.* This beautiful animal is about the size of a domestic cat and marked with dark spots and dashes on a tawny ground. Some are lighter colored than others. They are not easily got at, but cannot be called uncommon, though seldom seen.

They are found at *Simla*, *Mattiána*, *Piki*, &c.

The natives of the hills apply the name of "*Laggarbágha*" to the leopard, while in the plains the same is used to denote the hyæna. The leopard cat, (so called by collectors,) is by the hill people called "*Chota Laggarbágha*," and sometimes "*Laggarbágha ká buchhá*" or young leopard.

I have a very beautiful specimen alive, but so savage that I dare not touch her.

They breed in May and have three or four young at a birth, which are carefully deposited in caves or beneath large masses of rock.

The following is a sketch of my living specimen. Ears rounded and without tufts. Black at the base and summits, the middle space whitish. General color above, tawny, with numerous irregular spots of black or deep brown. Whiskers white with brown spots at the roots, arising from a white ground; lips white as also a stripe between the nose and the eye. A white patch on the cheeks surrounded with black forming two bands, the lower one turning downwards and uniting under the throat. Four dark lines along the head arising from the eyes and nose, the two centre ones forming a loop enclosing a dark spot, on the forehead.

Two oblong large brown spots on the shoulders or withers. Tail irregularly spotted to near the tip, where it becomes annulated. Feet with very small spots on a lighter ground; inside of the forelegs with one dark band, hind legs with two dark bands. Under parts white, spotted with black on the belly; somewhat banded with the same on the breast. An irregular line down the back, formed by a double row of oblong-shaped brown spots.

Fur soft; eyes brown.

I have a mutilated specimen which I bought from a villager at *Píkí* in the interior; it has the ground color above rather paler than my living animal, but in other respects does not differ.

The length from the nose to the origin of the tail is about seventeen or eighteen inches, and the tail eleven inches, giving a total of about two feet, four inches.

I am doubtful whether this should be considered as the *Bengal* or *Nepál* cat: it certainly has markings in some measure common to both, and as the habitat of the former does not appear to be strictly known and the descriptions are supposed to be taken from immature specimens, it is possible that the two may prove to be the same animal. The only descriptions of these animals that I have access to, are contained in the Naturalist's Library, and the animal there given as the Bengal cat is said to have been received from *Java.* The plate does not agree with my animal although in some respects the description does. In the synopsis at the end of the volume it is called the Bengal cat with a mark of doubt affixed. It is said that the "species is hardly confirmed by any author." With regard to the *Nepál* cat the figure in some measure agrees, as also the description. It is taken from the Zoological Journal, No. 15.

Hill Fox. *Canis vulpes montana*—Pearson. During the winter, especially when the snow is on the ground, these animals are very numerous about *Simla*, and come close to the houses in search of offal or other prey. It has been well described by Dr. J. T. Pearson in the *Journal Asiatic Society.*

They breed in the end of March or early in April and have three or four cubs at a birth.

I have three young ones alive about seven or eight weeks old; they are similar to the old ones in colors, except that they are somewhat paler; the males are larger and much darker than the females.

These animals are not confined to the lower hills but range up to the verge of the snows.

I have a fine male specimen which was shot near the snow, and a female which I caught in a trap at *Simla* in May. She had evidently cubs not far off.

Canis aureus. The jackal is found also in the valley of the *Pabbar.* We saw several in the rice fields near *Shèrgaon.* At *Simla* I have often heard the cry, or what is said to be the cry, of the female, but the male, never, although I have seen them. They do not appear to hunt in packs as they do in the plains, but are seen singly.

Langoor. *Hanumán.* Entellus monkey. *Semnopithecus entellus.*

This species is found at *Simla* all the year through, but when the snow falls during the winter it seeks a warmer climate, in the depth of the *khads*, returning again to the heights as it melts away. I have seen them however, in a fine sunshiny day even with the snow on the ground, leaping from tree to tree up and down the hill of *Jakú* at *Simla*, which is 8115 feet.

Royle is mistaken when he says, that "the Entellus alone ascends in the summer months as high as 9000 feet." I have seen them at *Nágkunda* in August at 9000 feet, and in winter on *Háttú* mountain which is 10,655 feet; and in winter at *Simla* with snow four or five inches deep, and hard frosts at night, as high as 8000 feet.

Rhesus monkey. *Bundur.* "*Simia rhesus.*" This species I saw repeatedly during the month of February when the snow was five or six inches deep at *Simla*, roosting? in the trees at night, on the side of *Jakú* and apparently regardless of the cold. It is somewhat hazardous to walk below a troop of these latter animals, for in searching for acorns and other seeds, they turn up the stones which are apt to come tumbling down on ones head.

The *Langoor* ascends and descends, from and into the *khads* by prodigious leaps from tree to tree, while the less timid *Rhesus* confines itself to the ground and mounts the trees only when pursued or to roost at night.

Flying Squirrel. *Pteromys.*

These are beautiful animals and leap with amazing agility from tree to tree. Their food consists chiefly of the young leaves and tender shoots of the oak tree. They breed in the holes which they gnaw in the trunks of trees and generally have one young one at a birth. When at rest they wrap themselves partially up in the lateral membranes and curl their long bushy tails around their heads, like the common squirrel of Britain. They are easily tamed when taken young. I have offered them various kinds of food, such as grain, wheat, leaves of trees, &c. but although they will eat attah cakes the favorite food appears to be oak leaves. When feeding, they sit up on the hinds legs and hold the food in the forefeet like a squirrel.

I have a living specimen which was brought to me from *Nágkunda*, along with its mother when quite small in the month of February, so that it must have been born in the latter end of January. There is another species much smaller and of a gray color sometimes met with in the interior, but from the few specimens brought in, it appears to be scarce.

The present species is of a deep red brown, interspersed with gray hairs; feet and tip of the tail black. Under parts pale orange.

I have no descriptions to refer to and therefore have not named it.

Wild goat. *Jehr.* *Capra jharal*—Hodgson.

We saw none of these animals during our trip, although our shikárís told us we crossed some of their haunts.

The Ghoral, (*Antilope Goral*,) and *Kukur* or Barking deer, (*Cervus Ratwa*,) are also met with at *Simla* and the interior. During the winter of 1835-36, a great number of the latter animals were killed in the snow, which lay in the month of February at *Simla* six to eight feet deep, and had not all melted away in shady places until the end of May!

Wild sheep. *Bharal.* *Ovis ammon.*

This animal is only found in the most inaccessible places among or verging on the snows. Their skins are brought down by the Tartars to the *Rampur* fair in November, and sold at about a rupee a piece. Their horns are presented to *Devi* and are hung up at the temples, or placed upon the cairns alluded to in the journal.

Musk deer. *Kastúra.* *Moschus moschiferus.*

These animals are found in the depths of the forest from *Muhássú* far into the interior. They appear to be shy and solitary animals, lying singly in the most retired places, usually near some steep overhanging rocks. On being disturbed they bound away down the *khads* with great swiftness. The animal is of a dark gray above, lighter on the inside of the limbs and beneath. The ears are large and usually carried erect. The males have no horns, but are furnished with two long recurved canine teeth hanging over the under lip from the upper jaw. The use of these, whether for defence or digging roots when the snow is lying on the earth in winter, is as yet, I believe, doubtful. The females and young males have neither these teeth nor the musk bag. It is a plump-looking animal and graceful in its movements, and when taken young is easily tamed. The natives of these hills call it "*Kastúra*."

A figure and description of this animal, taken from a specimen in the Edinburgh College museum appears in the "Naturalist's Library." The color is there given as "dark reddish brown," while all the skins I have seen of the musk deer of these hills were dark grey; in old specimens a faint reddish tinge was spread over the upper parts. Neither do the habits of the animal, as stated in that work, as far as I can gather from the hill shikárís and my own observation, agree with those of the animal known here as the musk deer. I transcribe a few lines, the better to point out in what the difference consists.

"Its habits, in fact, are similar to the chamois and some of the mountain goats, climbing and bounding among the precipices of the Alpine ridges of Central Asia with astonishing activity, assembling in herds, and often appearing in very considerable numbers." "They inhabit the region between *China* and *Tartary*, extending to the mountains above the sources of the *Indus*, and northward to near Lake *Baikal*.

At times they appear to migrate from one district to another, assembling previously in large herds. Some zoologists however have considered this assemblage not connected with migration, but consisting entirely of males in search of the female."

The *Kastúra* or musk deer of these hills is to be found in the deep forest shades of *Mahássú* throughout the year; I have seen them found from that place to the *Burenda Pass* and invariably single, sometimes a male, sometimes a female. The information obtained from the shikárís, is that they lie singly at all times except the rutting season, when a male and one or more females may be found together or near each other, but only for a short time. That they are never seen in herds. They breed in May and June at which season the shepherds in the interior catch the young ones.

I have seen the musk deer single in June, August, September, and October, and as they breed in May and June, they have only the most inclement season left for migrating, which is contrary to nature, as animals migrate in order to avoid inclemency. May there not be another species beyond the *Himálaya ?*

The color of the specimen in the *Edinburgh* museum may be owing to the preservation used in preparing the skin ! ?

It is generally supposed that the musk of this animal has some connection with the rutting season, it being strongest at that time. The idea I think is strengthened from the circumstance of the animal living such a solitary life, as the musk becoming strong at the season of love, is a means of guiding the females to the male, and thus the reason is plain why sometimes one and sometimes more females are found with one male; for in the almost endless forests of their haunts it may sometimes happen that only one or two deer may be found, while at other times several may be in the neighbourhood. This idea too, is more probable than that the male should seek the female, which being destitute of the musk, could in these immense tracts leave no guide to the male.

The circumstance of the female seeking the male, is by no means an anomaly in nature, for the *Cicada* tribe among insects, and the *Gryllides*, are led to the males by the sharp noise emitted by them.

The same reasoning may apply to the *Civet Cats*, which likewise emit the strongest smell, during the season of love.

Marmot? *Arctomys?*

These animals live in very large societies and feed on grasses and roots. They burrow in the earth like rabbits, to a great depth, and the holes are so connected under ground, that it is almost impossible to dig them out.

During the winter months they remain asleep in their subterranean retreats. They are the tailless rats mentioned by TURNER, HERBERT, GERARD, and other travellers.

Thibet Bear. *Ursus Tibetanus.* These animals are numerous in the interior but only visit the neighbourhood of *Simla* during the winter, retiring again as the weather becomes hotter.

There is another kind of bear among the snowy regions of a dirty sandy color. I once saw a tame one, but foolishly made no note on it.

The natives draw a strong line between the two, and say that the black bear lives on fruits and roots, while the sandy bear eats flesh.

GERARD mentions having seen the latter and says the two are identical.

[A note received while this is in the press adds to the above list of birds and animals found in the *Simla* hills some others known from Mr. HODGSON's Nepal collection :—the "*Surrow*" or *Eimoo:* the *Martis flavigula* in pairs, decidedly plantigrade—the *Lynchus erythrotis*, HODG. Also a weasel found in villages, like *Mustela vulgaris*. We have not space for particulars.—ED.]

NOTE.—For the altitudes of the different places mentioned I am indebted to the kindness of Captain P. GERARD, residing at *Simla*.

[We take the opportunity of appending to Lieut. HUTTON's paper a table of barometric heights taken in a trip to the *Burenda pass* by Mr. E. C. RAVENSHAW, C. S. in 1829, which has been some time in our possession.—ED]

				Baro.	*Th.att.*	*det.*			*Feet.*
May, 18	6½	P. M.	Bridge at the Jumna, ...	27.71	70	67	=	about	2193*
19	11	A. M.	Tents at Nagthí, ...	24.12	74	70	=	..	5795
20	4	P. M.	Muktí, ...	23.984	68½	71	=	..	5805
21	7½	A. M.	Thanna Túngra,............	23.040	66	60	=	..	6851
22	10	A. M.	Tents on Deobun, ...	21.932	62	63		..	7947
24	6	P. M.	Búndroulí,..................	24.65	70	67		..	5253

* N. B. In this rough calculation of the heights after deducting .003 of an inch for every degree of heat above 32° in the attd. thermometer, I have allowed 1000 feet for every degree of the barometer below 29.789, (which from the No. 34 of GLEANINGS OF SCIENCE appears to be the average height of the barometer at the sea, taken the height of Calcutta at 25 feet as estimated in Lieut. BARNES' letter in the same No.) In NICHOLSONS' or the Edinburgh Encyclopædia only 900 feet are allowed

			Baro.	Th.att.	det.			Feet.
25		Noon at Dhargadh stream, ...	26.69	74	74	..		3265
	7	P. M. Kandhú, ...	25.28	66	64	..		4611
26	7	A. M. At the Jhúla over the Tonse,	27.023	60	60	..	*	2850
27	10	A. M. Earí on the Pabbar, ...	26.17	77½	77	..		3754
28	10	A. M. Temple at Hath,............	25.35	84	77	..	†	4595
29	10	A. M. Rúrú,....	24.97	75	72	..	‡	4948
30	10	A. M. Sérgaon, ...	24.22	80	76	..		5713
31	4	P. M. Pèka,..............	22.15	59	53	..		7720
June 1	8	A. M. Janglíg,.....................	21.568	64	58	..		8221
2	3	P. M. Lítí, ...	19.62	52	50	..		10229
3	9¾	A. M. Crest of the Búran Ghât or Burenda Pass,......	17.211	56	43	..		12650

II.—*Discovery of the Rekhá Ganita, a translation of the Elements of Euclid into Sanskrit by* Samrát Jagannátha, *under the orders of Rája* Siwái Jaya Sinha *of Jaipur. By* Lancelot Wilkinson, *Esq. C. S. Resident at Bhopál*§.

I lately had the good fortune to procure a copy of the *Rekhá Ganita* or Sanskrit version of Euclid's Elements, which was made by the order of Sewái Jaya Singh rája of *Jaipur.* This chief, the flower of the Hindu princes of Hindustan, ascended the *gaddi* of *Jaipur* in A. D. 1699, and died after a reign of 44 years in A. D. 1743. He was distinguished by an ardent passion for the study of mathematics and especially of astronomy, and he did more to promote the cultivation of sound science in this benighted land than any other Hindu prince on record. Some details of his astronomical labours have been published to the European world by the late ingenious Dr. Hunter in his

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to a barometrical degree or inch, but as other modes of calculation adopted by Graham give more, I have assumed 1000 feet as a fair standard. With this liberal allowance however the *Burenda Pass* instead of being upwards of 15,000 feet appears to be only 12,650.

* The spot where the observation was taken being about 20 feet above the water and distance between the *Jhúla* and *Earí*, about 12 inches, 3754 — 2830 = 924 ÷ 12 = 77 feet per mile.

† *Hath* being 50 feet above water and distance from *Earí* 14 miles, 4545 — 3754 = 791 ÷ 14 = 57½ per mile.

‡ *Rúrú* ditto and dist. from *Hath* 8 miles, 4898 — 4545 = 353 ÷ 8 = 44 per mile.

N. B. Observed at *Earí* in the evening that the water in *Pabbar* had fallen about 2½ inches since day break. Hove the log in shape of a tent peg, but the rapidity of stream did not prove more than 3 miles per hour, at *Shèrgaon*, *Píka*, *Janglig*, *Líti*. Rain every day about 4 o'clock. Snowy mountains clear in the morning but invariably clouded at noon.

§ We insert this notice with pleasure because it may excite attention to the work; but the Rekhá Ganita is not unknown here.—A copy exists in the Sanskrit College, which with a Sanskrit commentary was at Prof. Wilson's suggestion to have been printed; but the *suspension order* put it on the shelf!—Ed.